UNIMORE
UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

Azienda Ospedaliero - Universitaria Modena

Sportello Giovani
organizza per i giovani professionisti un corso di formazione teorico pratico in emergenza e urgenza

CORSO DI FORMAZIONE TEORICO PRATICO DI EMERGENZA URGENZA

GESTIONE DELLE EMERGENZE NEUROLOGICHE

STROKE: INQUADRAMENTO DIAGNOSTICO

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Clinica Neurologica
Dipartimento di Neuroscienze
Nuovo Ospedale Civile "S.Agostino-Estense"
Azienda Ospedaliera Universitaria di Modena

Ictus

Ischemico

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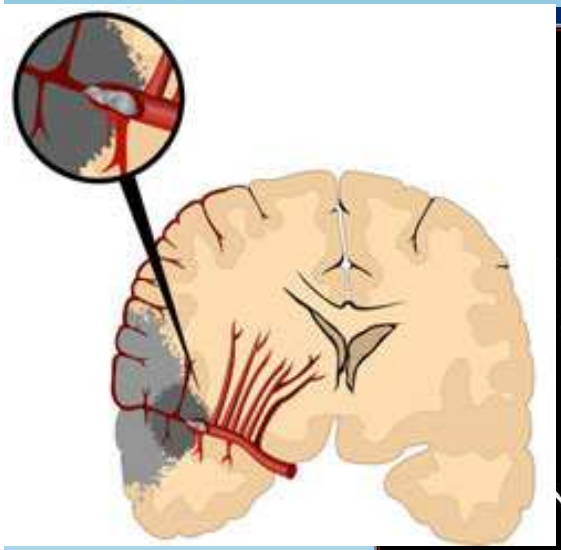
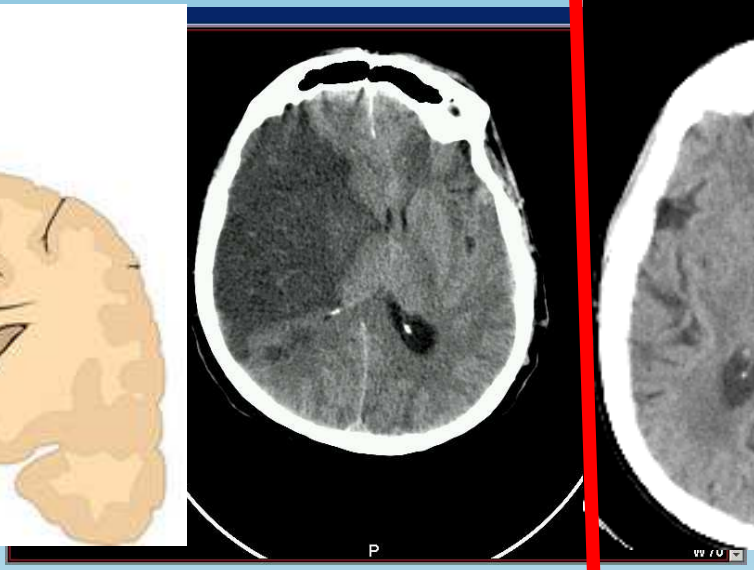
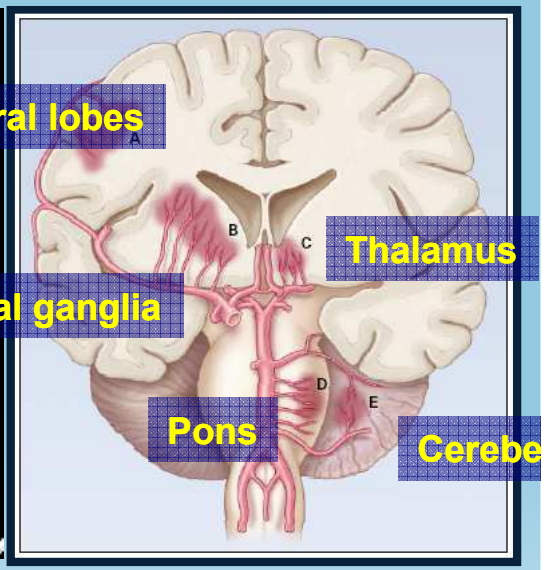




Emorragico

20%



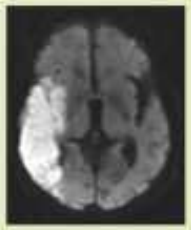
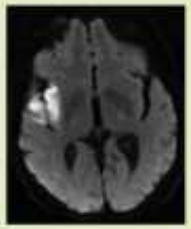
Tipologie di ictus ischemico

Table 1 – Modified TOAST classification of ischemic stroke subtypes[8]

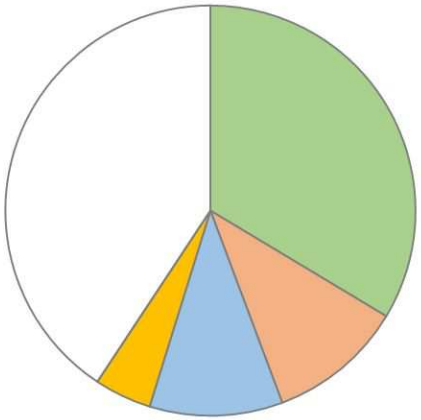
1. Atherosclerosis of great vessels
2. Cardioembolism (excluding cases attributed to PFO/atrial septal defects)
3. Occlusion of small vessels (lacunar)
4. IS of another etiology (defined)
5. Two or more identified causes
6. Cryptogenic ischemic stroke

PFO - patent foramen ovale; IS - ischemic stroke.

Oxfordshire Community Stroke Project (OCSP) classification: syndromes and imaging examples

OCSP term	Clinical features	Vascular basis	Example CT	Example MRI
Total Anterior Circulation Syndrome (TACS)	• Hemiparesis **AND** • Higher cortical dysfunction (dysphasia or visuospatial neglect) **AND** • Homonymous hemianopia	Usually proximal middle cerebral artery (MCA) or ICA occlusion		
Partial Anterior Circulation Syndrome (PACS)	• Isolated higher cortical dysfunction **OR** • Any two of hemiparesis, higher cortical dysfunction, hemianopia	Usually branch MCA occlusion		
Posterior Circulation Syndrome (POCS)	• Isolated hemianopia (posterior cerebral artery (PCA)) brainstem or cerebellar syndromes	Occlusion of vertebral, basilar, cerebellar or PCA vessels		
Lacunar Syndrome (LACS)	• Pure motor stroke **OR** • Pure sensory stroke **OR** • Sensorimotor stroke **OR** • Ataxic hemiparesis **OR** • Clumsy hand-dysarthria	Small penetrating artery occlusion, usually in lenticulostriate branches of MCA, or supply to brainstem or deep white matter		

Stroke Subtype Classification to Mechanism-Specific and Undetermined Categories by A-S-C-O



Stroke 2010; 41: 1579-1586

Causative Classification System (CCS)

Automated version of the SSS-TOAST (Arsava et al,Neurology 75 October 5, 2010) (https://ccs.mgh.harvard.edu)

5 Subtype CCS	8 Subtype CCS	16 Subtype CCS
Supra-aortic large-artery atherosclerosis	Supra-aortic large-artery atherosclerosis	Supra-aortic large-artery atherosclerosis
		Evident, probable, possible
Cardioaortic embolism	Cardioaortic embolism	Cardioaortic embolism
		Evident, probable, possible
Small-artery occlusion	Small-artery occlusion	Small-artery occlusion
		Evident, probable, possible
Other uncommon causes	Other uncommon causes	Other uncommon causes
		Evident, probable, possible
Undetermined	Undetermined	Undetermined
	Unknown-cryptogenic embolism	Unknown-cryptogenic embolism
	Unknown-other cryptogenic	Unknown-other cryptogenic
	Unclassified	Unclassified
	Incomplete evaluation	Incomplete evaluation

Introduction – ASCO/ASCOD – phenotypic approach

Proposed a new approach to stroke subtyping: ´stroke *phenotyping*´ classification (i.e. stroke etiology and the presence of all underlying diseases, divided by grade of severity).

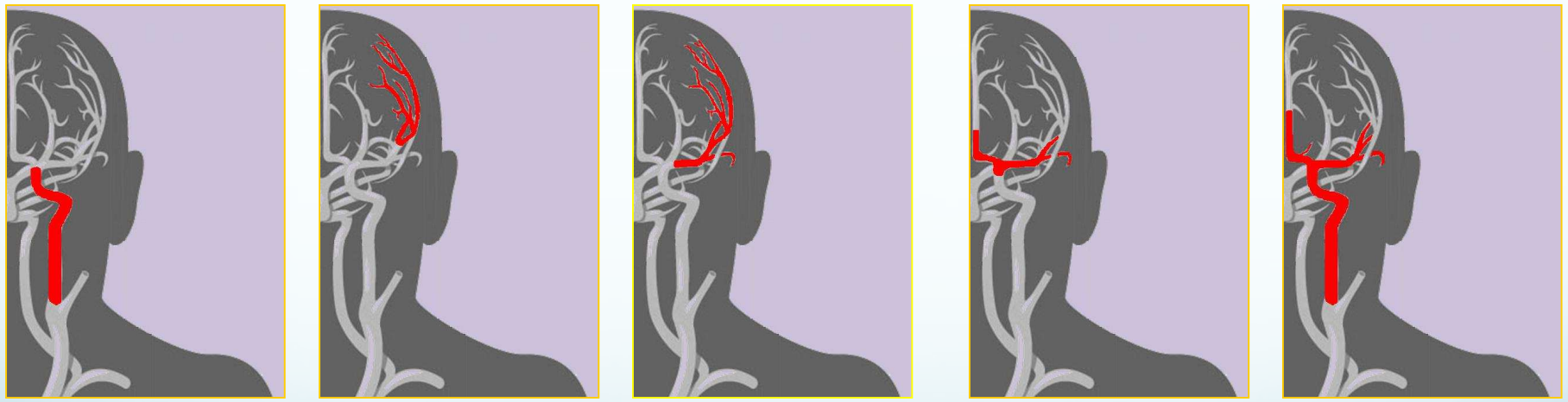
ASCOD	A-S-C-O-D: A for atherosclerosis, S for small vessel disease, C for cardiac source, O for other cause, D for dissection.
Publication date	2009/2013
Type of system	PHENOTYPIC
Kappa for interexaminer realiability	0,79
Neuroimaging	CT, MRI (HR)
Vascular imaging	US, CTA, MRA (HR/TOF/CE), ARTERIOGRAPHY, perfusion CT and MR, TEE, TCD
Stenosis measure	-
Stenosis threshold	≥70% (2009)/ ≥50% (2013)

A	ATHEROSCLEROSIS
S	SMALL VESSEL DISEASE
C	CARDIAC SOURCE
O	OTHER CAUSE
D	DISSECTION

GRADES OF PATHOLOGY	It is estabilished a degree of likelihood of causality between the index ischemic stroke and each category:
1	Definitely a potential cause of the index stroke
2	Causality uncertain
3	Unlikely a direct cause of the index stroke (but disease is present)
0	Absence of disease
9	Grading is not possible due to insufficient work-up

Aterotrombotico

Pattern occlusivi



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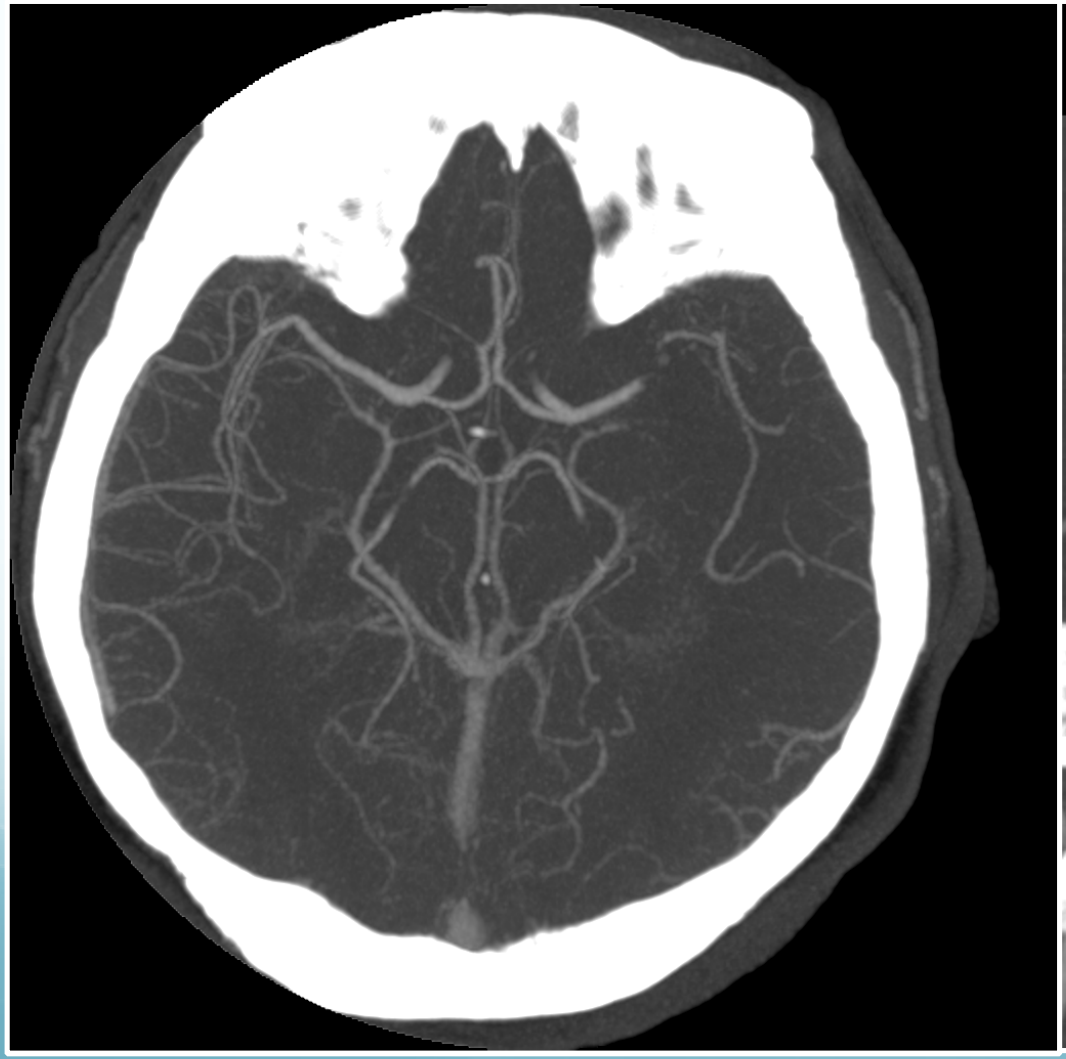
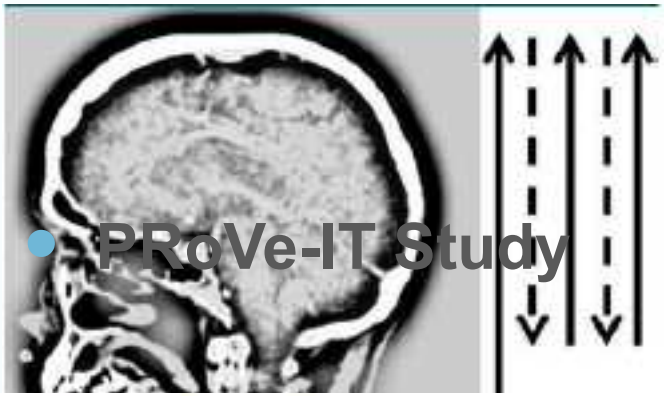
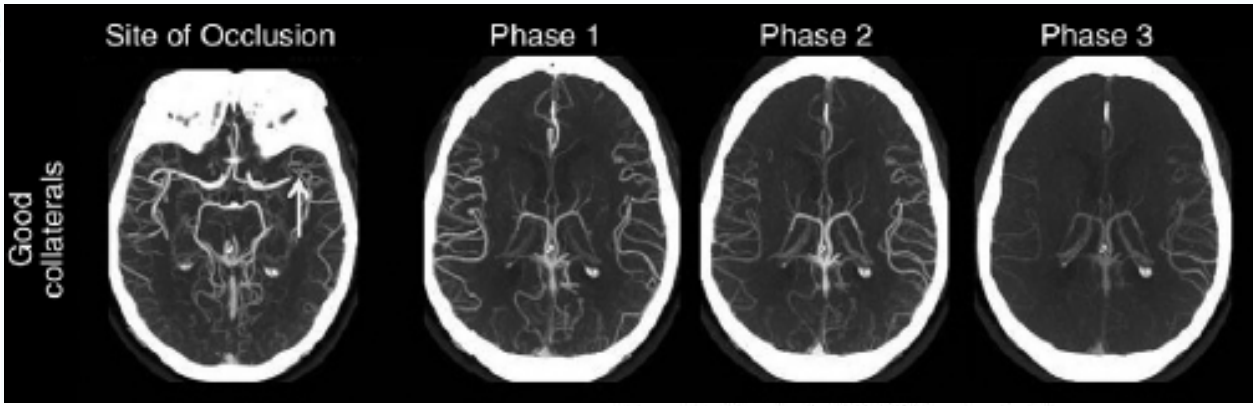


AngioTC trifasica -circoli collaterali.-



- PRoVe-IT Study



ClinicalTrials.gov
A service of the U.S. National Institutes of Health

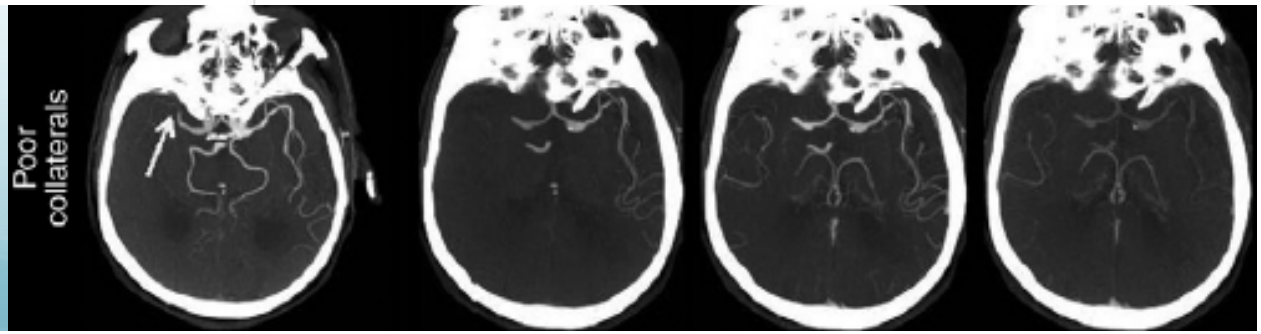
Example: "Heart attack" AND "Los Angeles"
Search for studies: Search
Advanced Search | Help | Studies by Topic | Glossary

Find Studies | About Clinical Studies | Submit Studies | Resources | About This Site

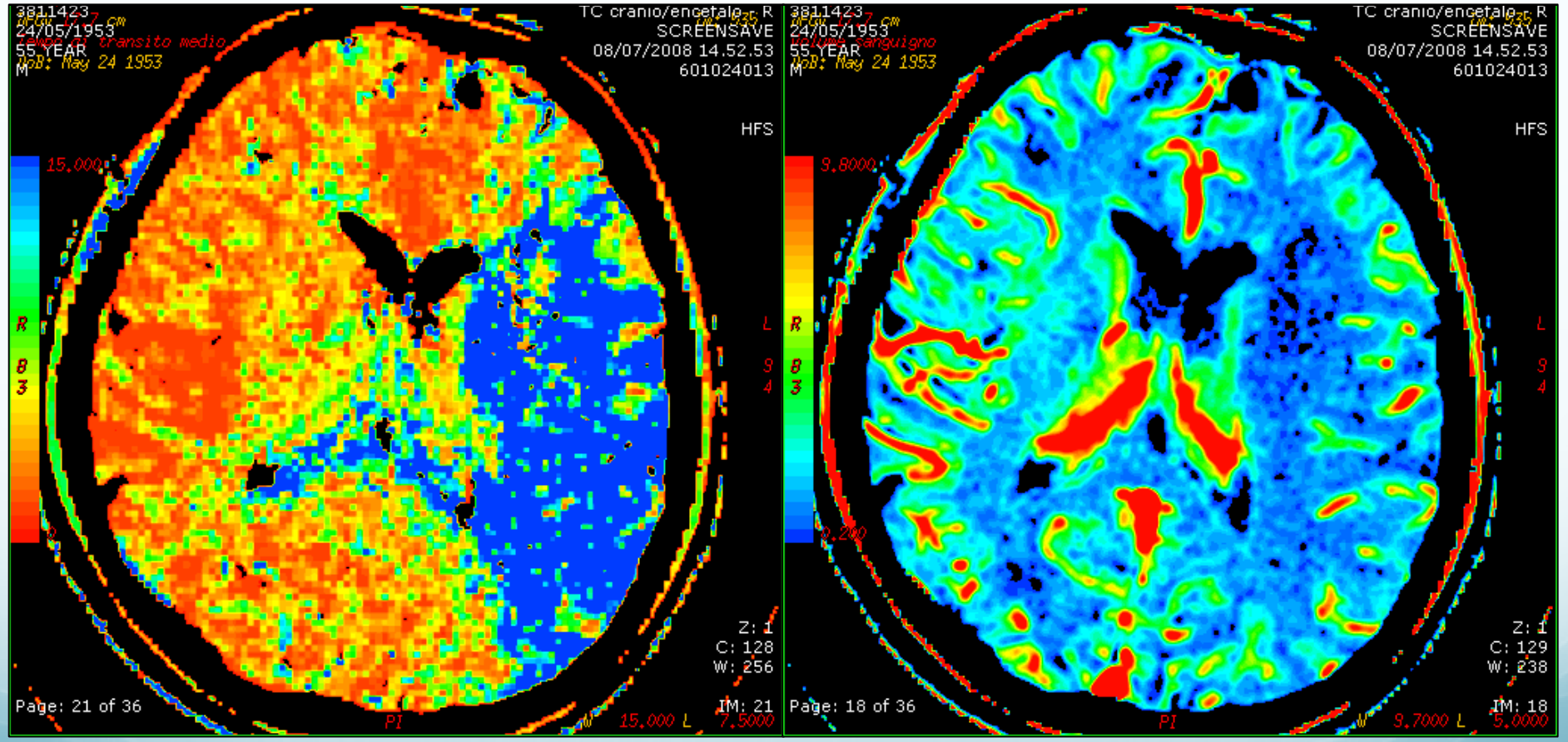
Home > Find Studies > Study Record Detail

Text Size

Measuring Collaterals With Multi-phase CT Angiography in Patients With Ischemic Stroke (PRove-IT)



Neuroimmagini per la selezione del paziente



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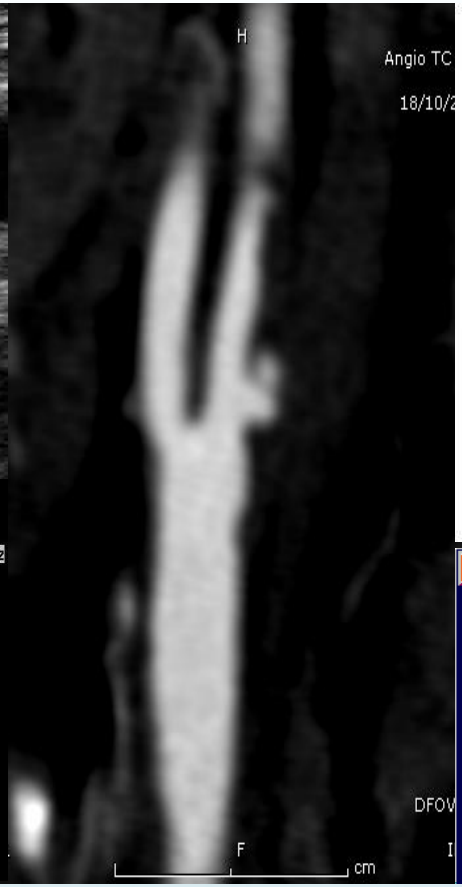
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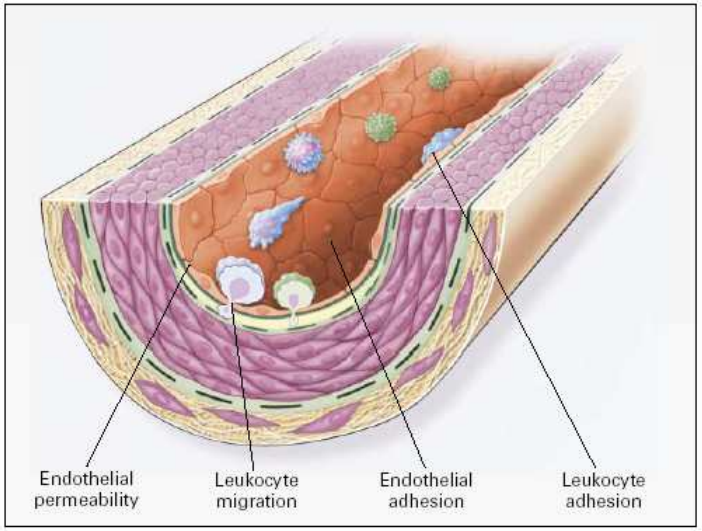
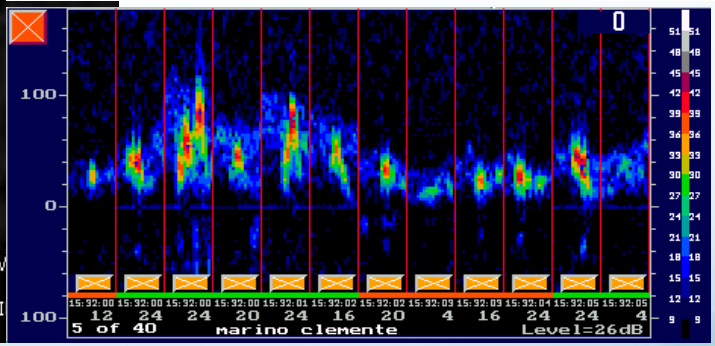

Endothelial permeability
Leukocyte migration
Endothelial adhesion
Leukocyte adhesion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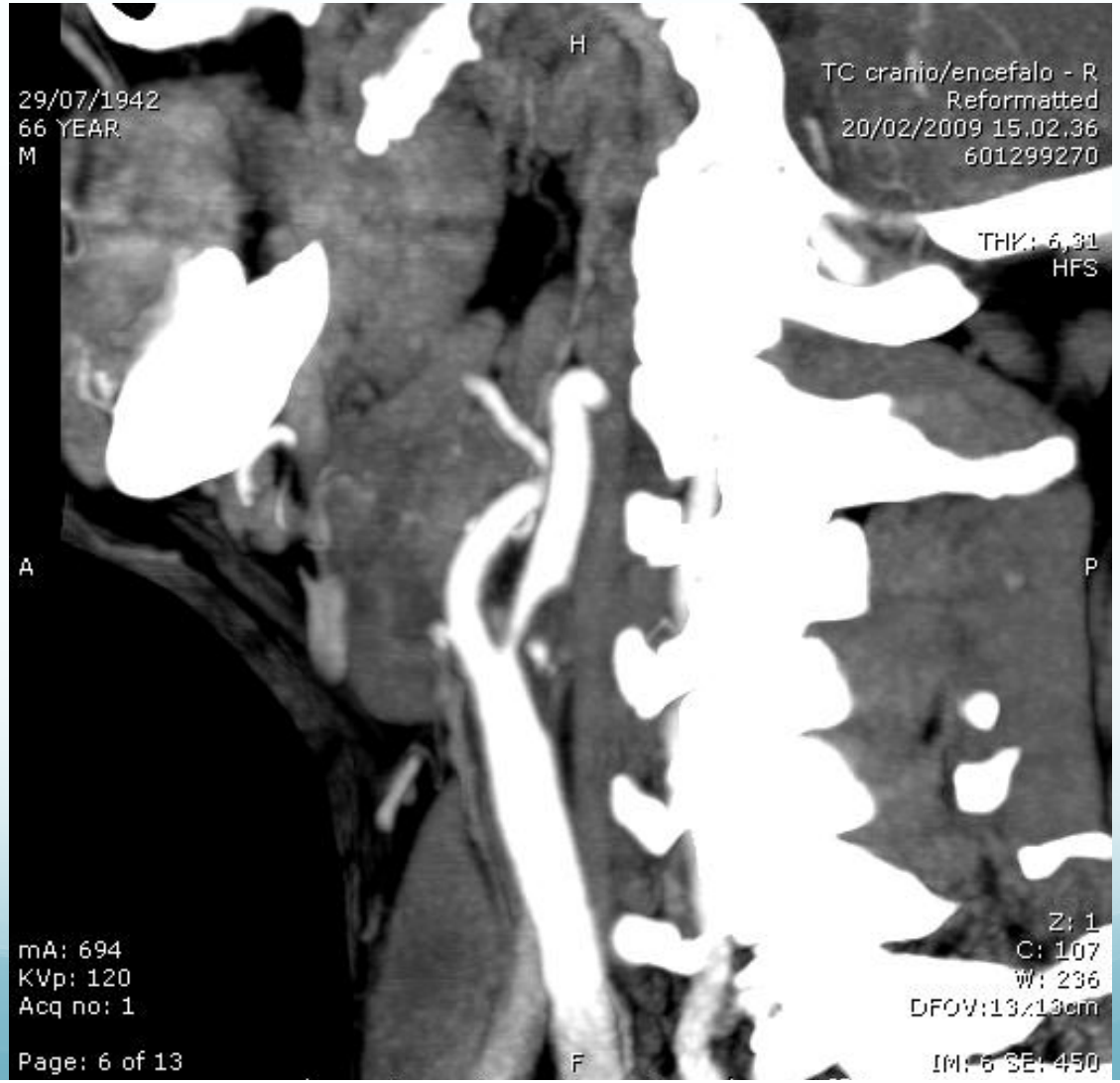

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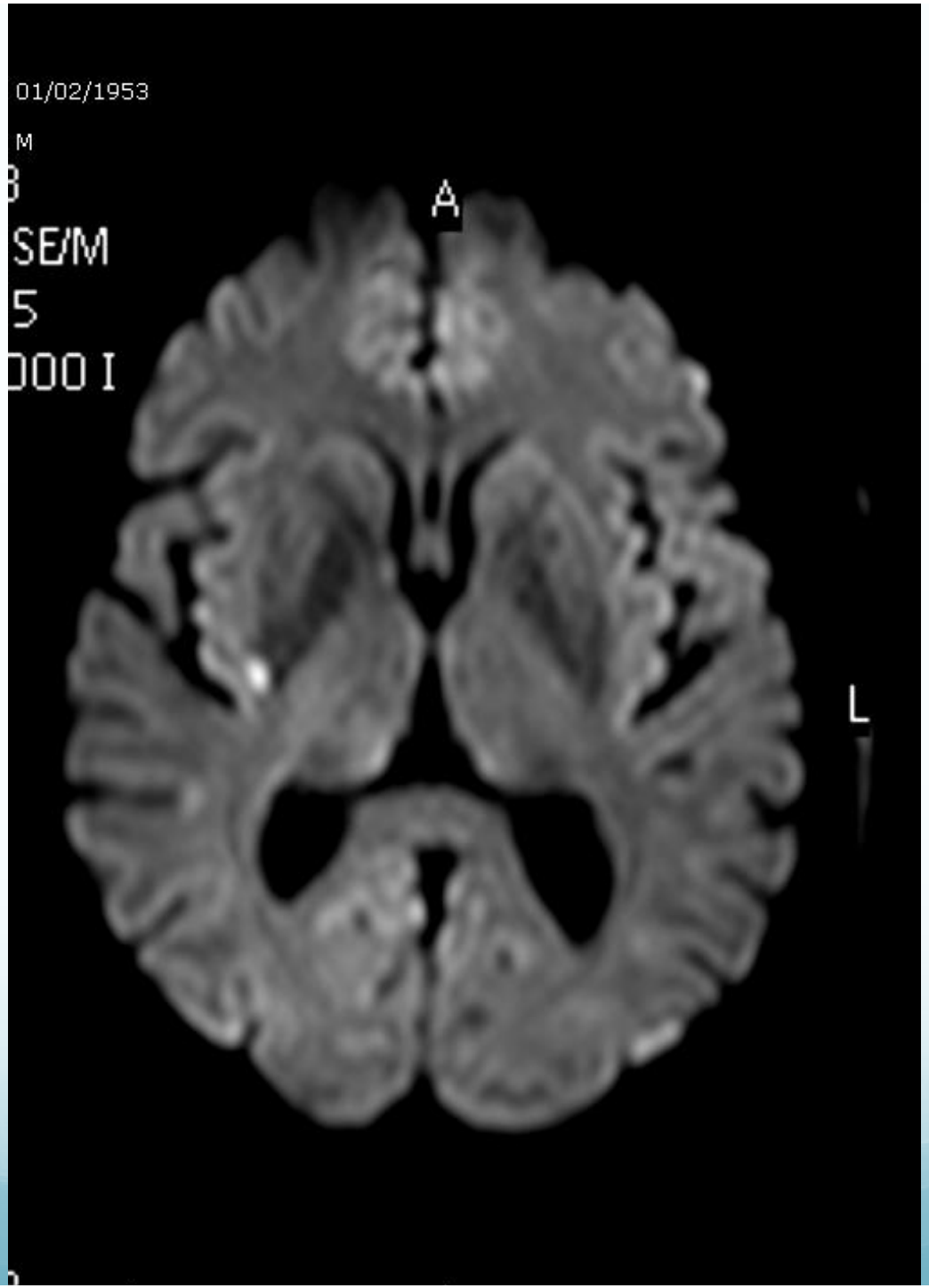
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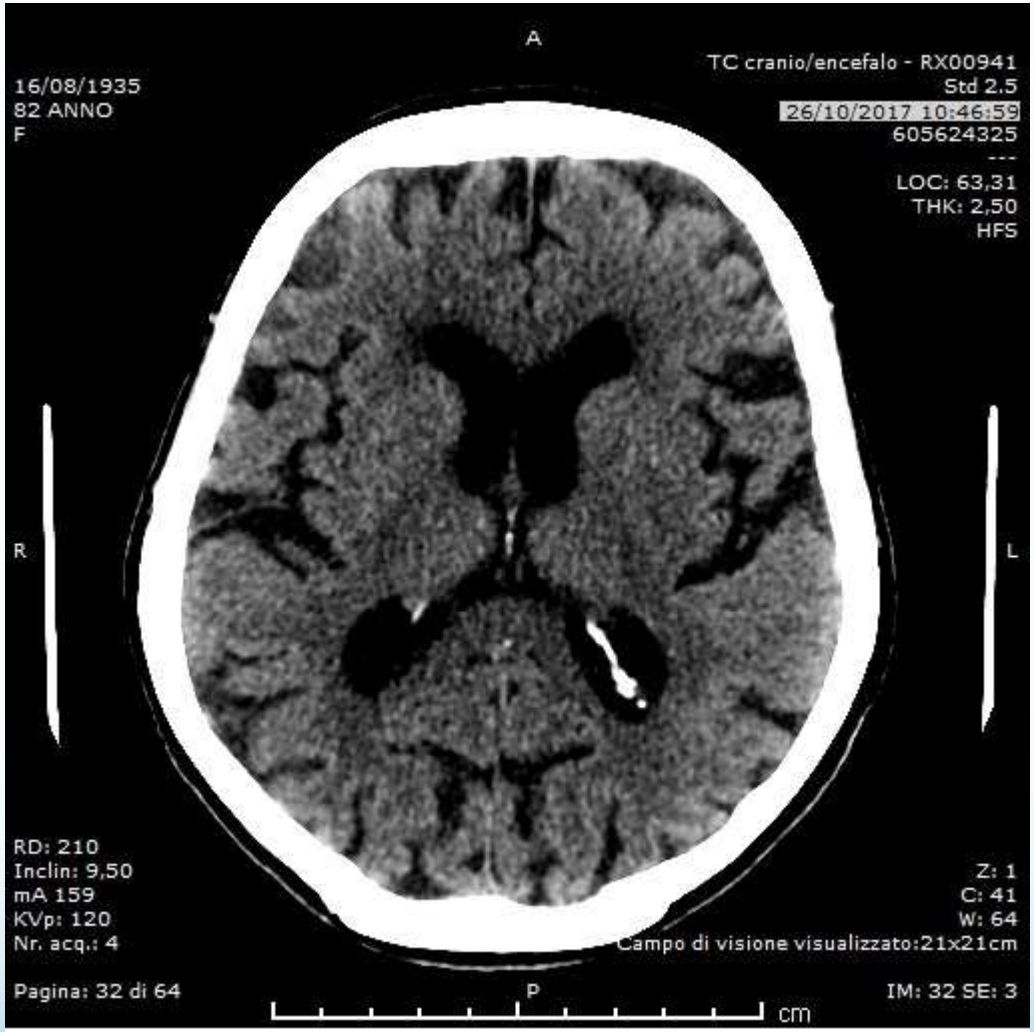
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Cardioembolico

Fonti cardioemboliche

Table I **Potential cardioembolic sources**

Major risk sources	Minor or unclear risk sources
Atrial fibrillation	Mitral valve prolapse
Recent myocardial infarction	Mitral annulus calcification
Previous myocardial infarction (LV aneurysm)	
Cardiomyopathies	Calcified aortic stenosis
Cardiac masses	
Intracardiac thrombus	Atrial septal aneurysm
Intracardiac tumours	
Fibroelastoma	Patent foramen ovale
Marantic vegetations	
Rheumatic valve disease (mitral stenosis)	Giant Lambl's excrescences
Aortic arch atheromatous plaques	
Endocarditis	
Mechanical valve prosthesis	

Fonti cardioemboliche

Cardiac Source of Embolism	Total Patients
Atrial fibrillation	318 (79.1%)
Lone atrial fibrillation	
Associated with structural cardiac disease	
Hypertensive left ventricular hypertrophy	120 (29.8%)
Associated with atrial fibrillation	
Associated with atrial flutter	
Left ventricular systolic dysfunction	91 (22.6%)
Sinus rhythm	
Atrial fibrillation	
Rheumatic mitral valve disease	50 (12.4%)
Mitral annular calcification	40 (9.9%)
Mitral valve prolapse	5 (1.2%)
Atrial septal aneurysm with patent foramen ovale	4 (1%)
Degenerative heart valve disease	4 (1%)

Arboix, Current Cardiology Reviews 2010

European Heart Journal Advance Access published February 4, 2016

European Heart Journal
doi:10.1093/eurheartj/ehw069

REVIEW

Prevention

Choosing a particular oral anticoagulant and dose for stroke prevention in individual patients with non-valvular atrial fibrillation: part 2

Hans-Christoph Diener[1]*, James Aisenberg[2], Jack Ansell[3], Dan Atar[4], Günter Breithardt[5], John Eikelboom[6], Michael D. Ezekowitz[7,8,9], Christopher B. Granger[10], Jonathan L. Halperin[11], Stefan H. Hohnloser[12], Elaine M. Hylek[13], Paulus Kirchhof[14,15], Deirdre A. Lane[16], Freek W.A. Verheugt[17], Roland Veltkamp[18], and Gregory Y.H. Lip[19,20]

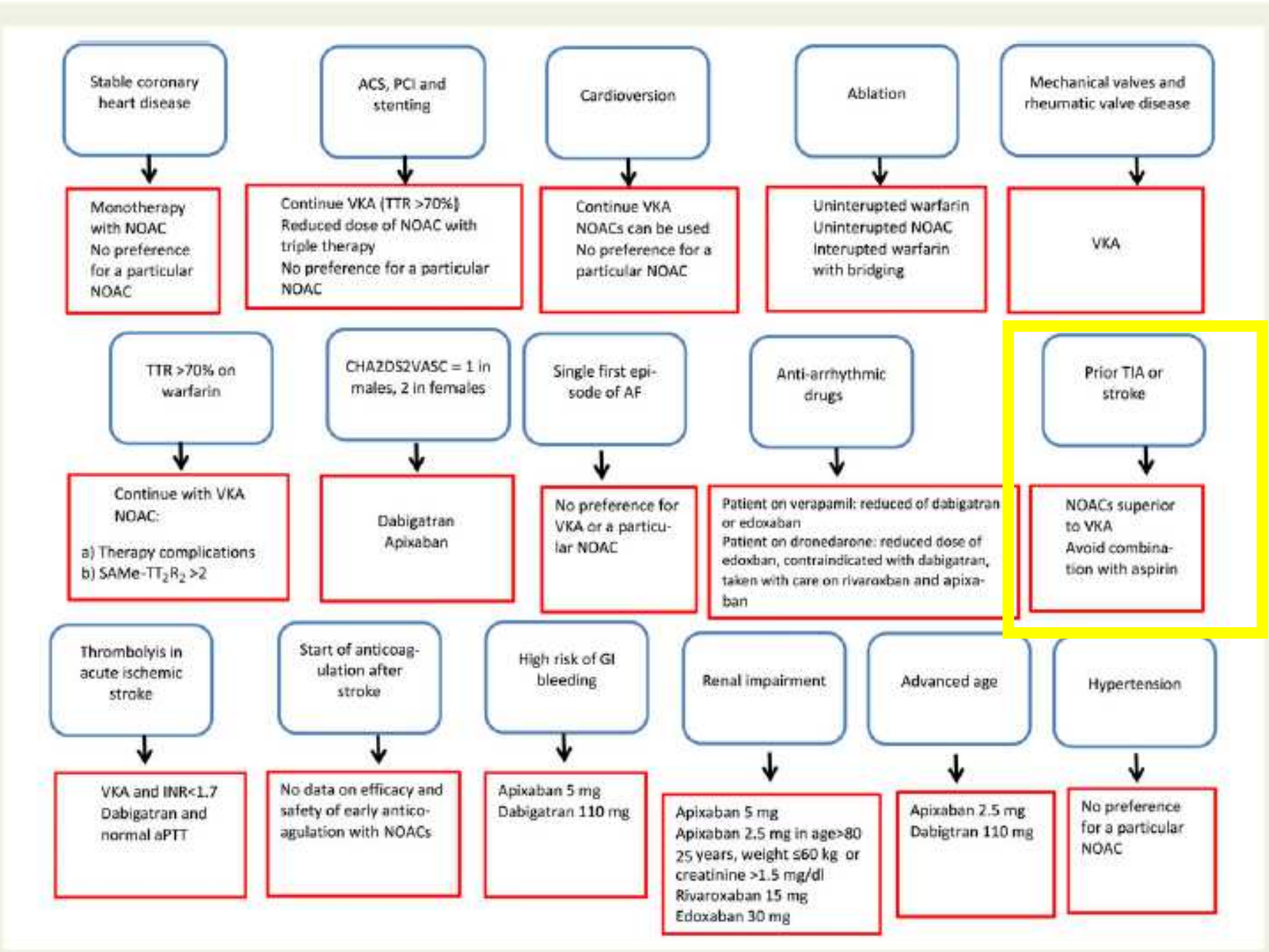

Figure 1 Summary of the treatment suggestions.

Secondary stroke prevention

First choice	NOACs as a group are superior to warfarin for secondary stroke prevention in patients with AF
Comment	Aspirin should not be used for secondary stroke prevention in patients with AF. The combination of antiplatelet therapy plus OAC in patients with AF does not prevent major ischaemic events better than does OAC monotherapy and should be restricted to specific high-risk periods

Early Recurrence and Cerebral Bleeding in Patients With Acute Ischemic Stroke and Atrial Fibrillation

Effect of Anticoagulation and Its Timing: The RAF Study

Mauriz

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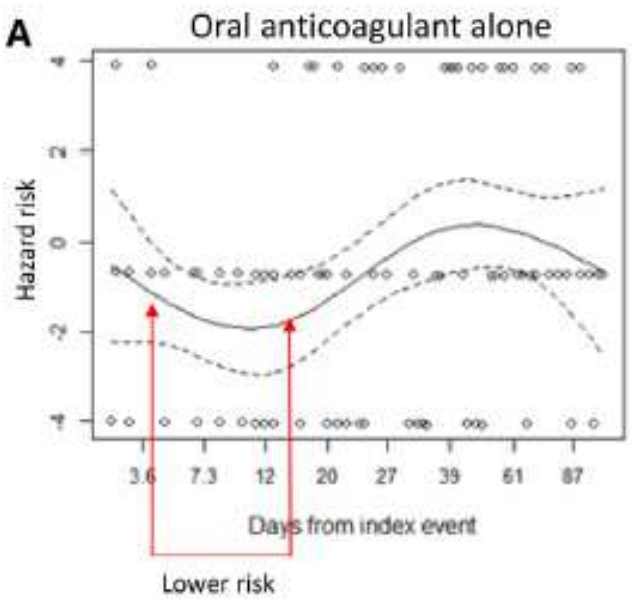
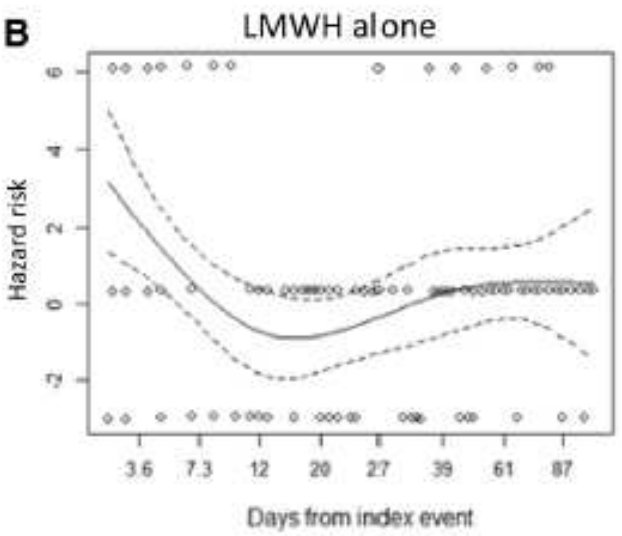
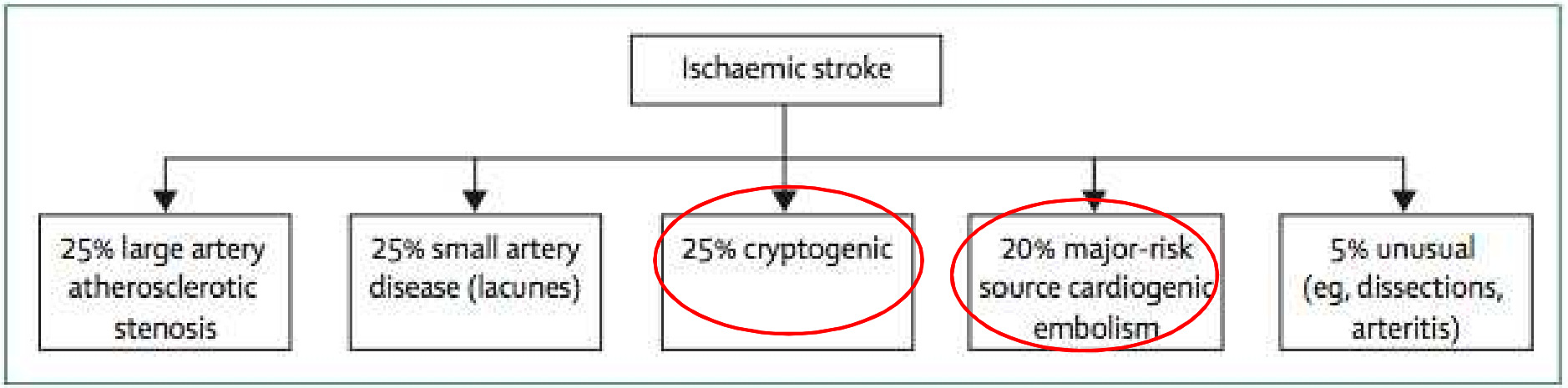




	Coef	exp(coef)	se(coef)	z	Pr(>|z|)
Bridging therapy	0.3214	1.3791	0.2577	1.247	0.2122
LMWH	0.3986	1.4897	0.2898	1.375	0.1691
ORAL alone	-0.4749	0.6220	0.2750	-1.727	0.0842 .

ESUS



Criteria for diagnosis of ESUS:

- Stroke detected by CT or MRI that is not lacunar†
- Absence of extracranial or intracranial atherosclerosis causing ≥50% luminal stenosis in arteries supplying the area of ischaemia
- No major-risk cardioembolic source of embolism‡
- No other specific cause of stroke identified (eg, arteritis, dissection, migraine/vasospasm, drug misuse)

Lancet Neurol 2014; 13: 429–38

Panel 1: Causes of embolic strokes of undetermined source

Minor-risk potential cardioembolic sources*

Mitral valve

- Myxomatous valvulopathy with prolapse
- Mitral annular calcification

Aortic valve

- Aortic valve stenosis
- Calcific aortic valve

Non-atrial fibrillation atrial dysrhythmias and stasis

- Atrial asystole and sick-sinus syndrome
- Atrial high-rate episodes
- Atrial appendage stasis with reduced flow velocities or spontaneous echodensities

Atrial structural abnormalities

- Atrial septal aneurysm
- Chiari network

Left ventricle

- Moderate systolic or diastolic dysfunction (global or regional)
- Ventricular non-compaction
- Endomyocardial fibrosis

Covert paroxysmal atrial fibrillation

Cancer-associated

- Covert non-bacterial thrombotic endocarditis
- Tumour emboli from occult cancer

Arteriogenic emboli

- Aortic arch atherosclerotic plaques
- Cerebral artery non-stenotic plaques with ulceration

Paradoxical embolism

- Patent foramen ovale
- Atrial septal defect
- Pulmonary arteriovenous fistula

Ecocardiogramma

ECG-Holter

AngioTC

Ecocardio + TCCD

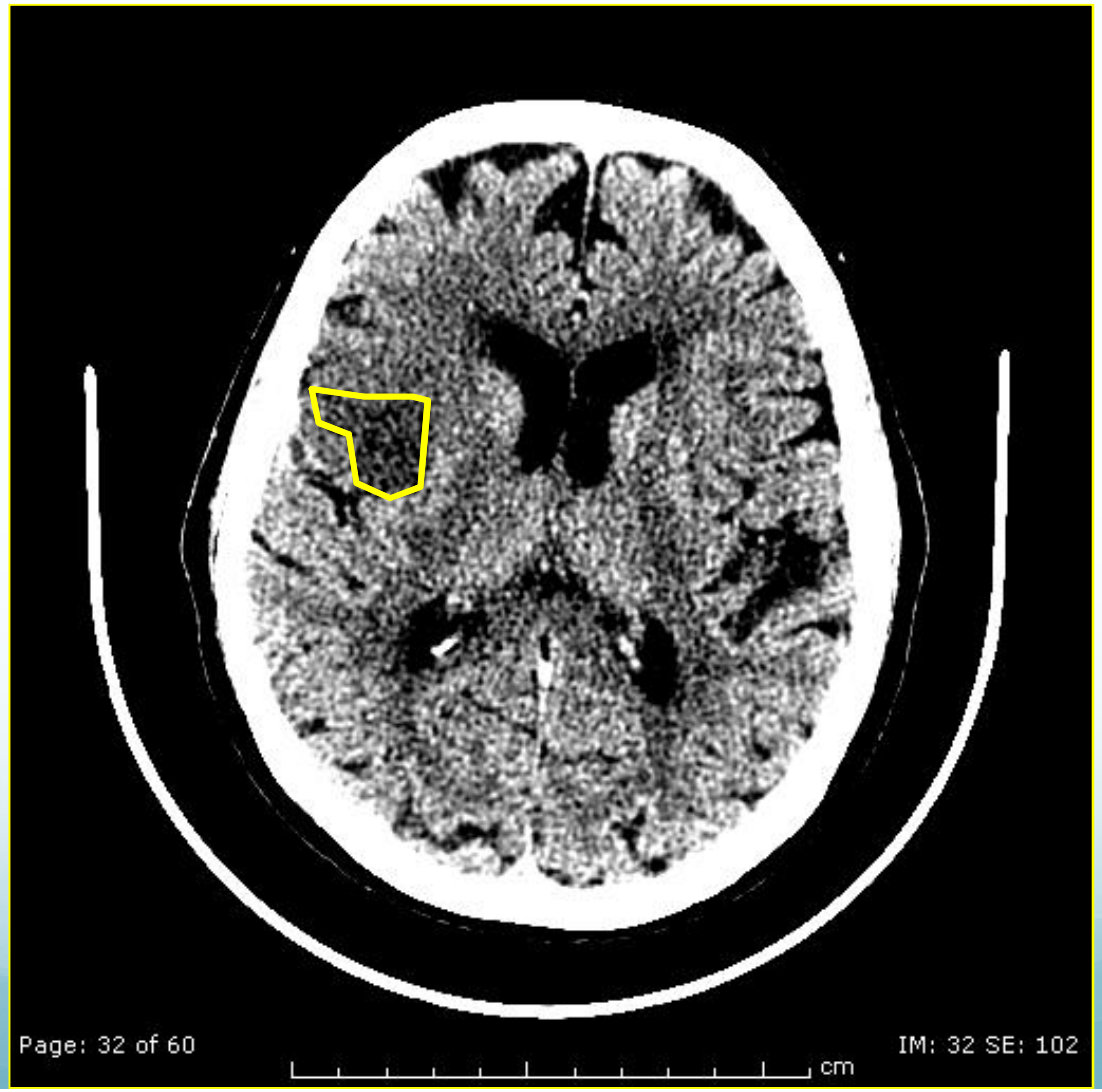
"If It Looks Like a Duck, Walks Like a Duck, and Quacks Like a Duck… It Must Be a Duck"

Anticoagulation in Stroke Patients With Suspected Atrial Fibrillation

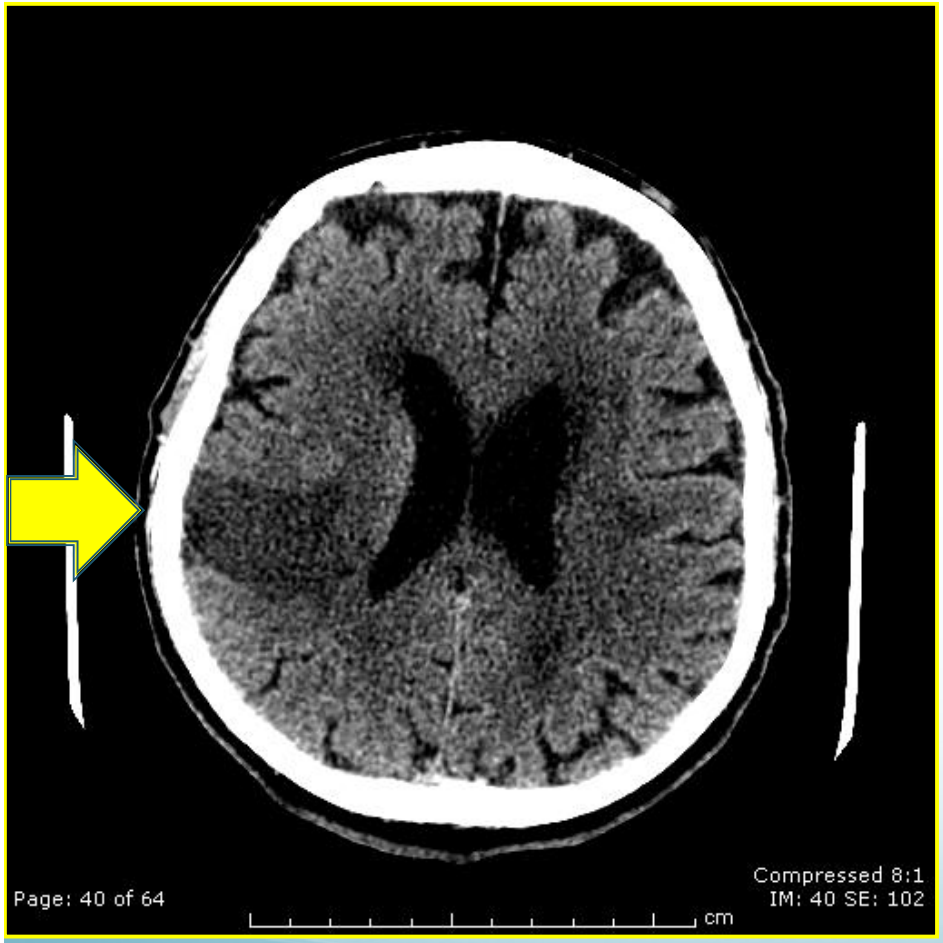
Carlos A. Molina, MD, PhD; Magdy Selim, MD, PhD

Molina, Stroke 2013

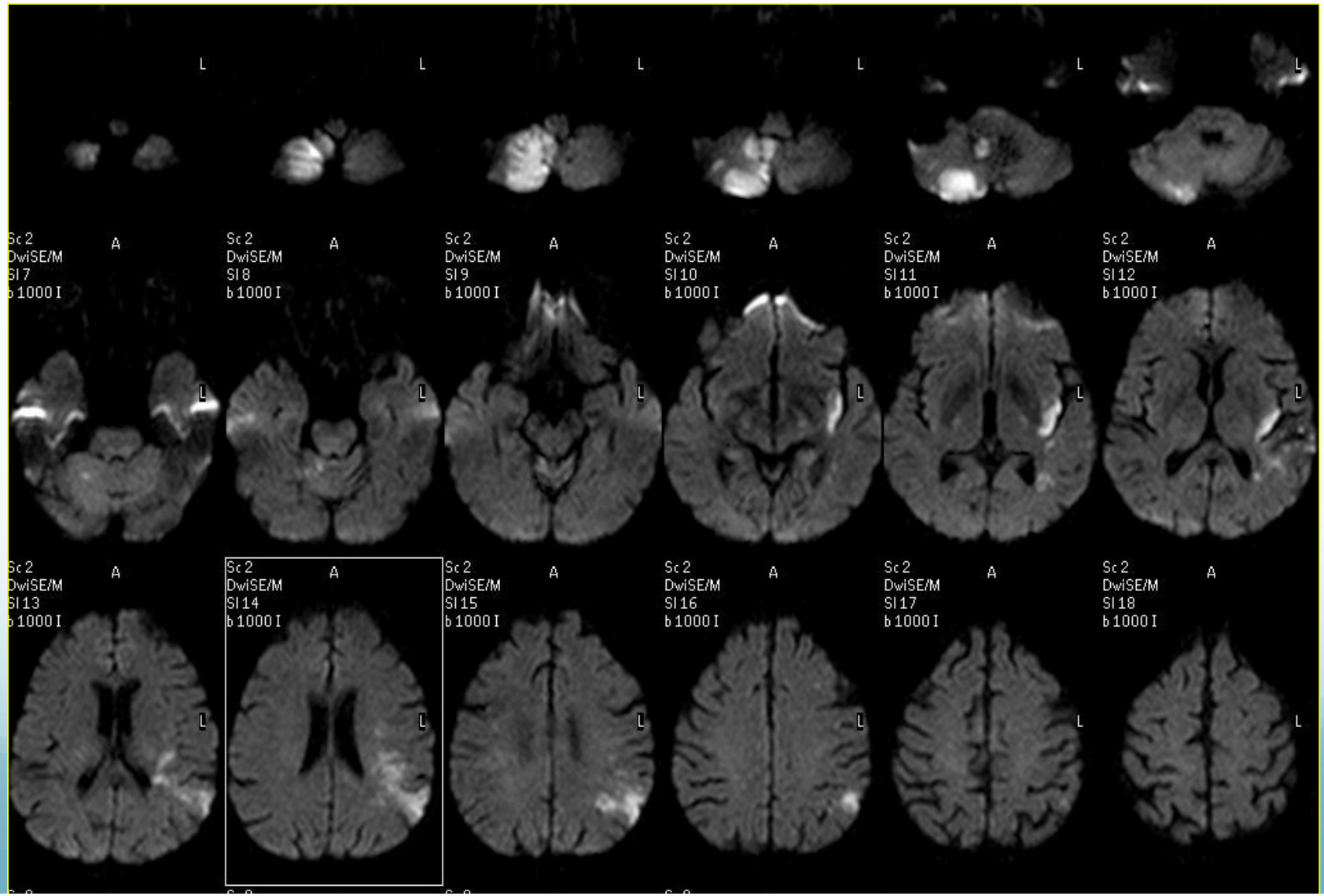
Lesioni ischemiche emboliche corticali



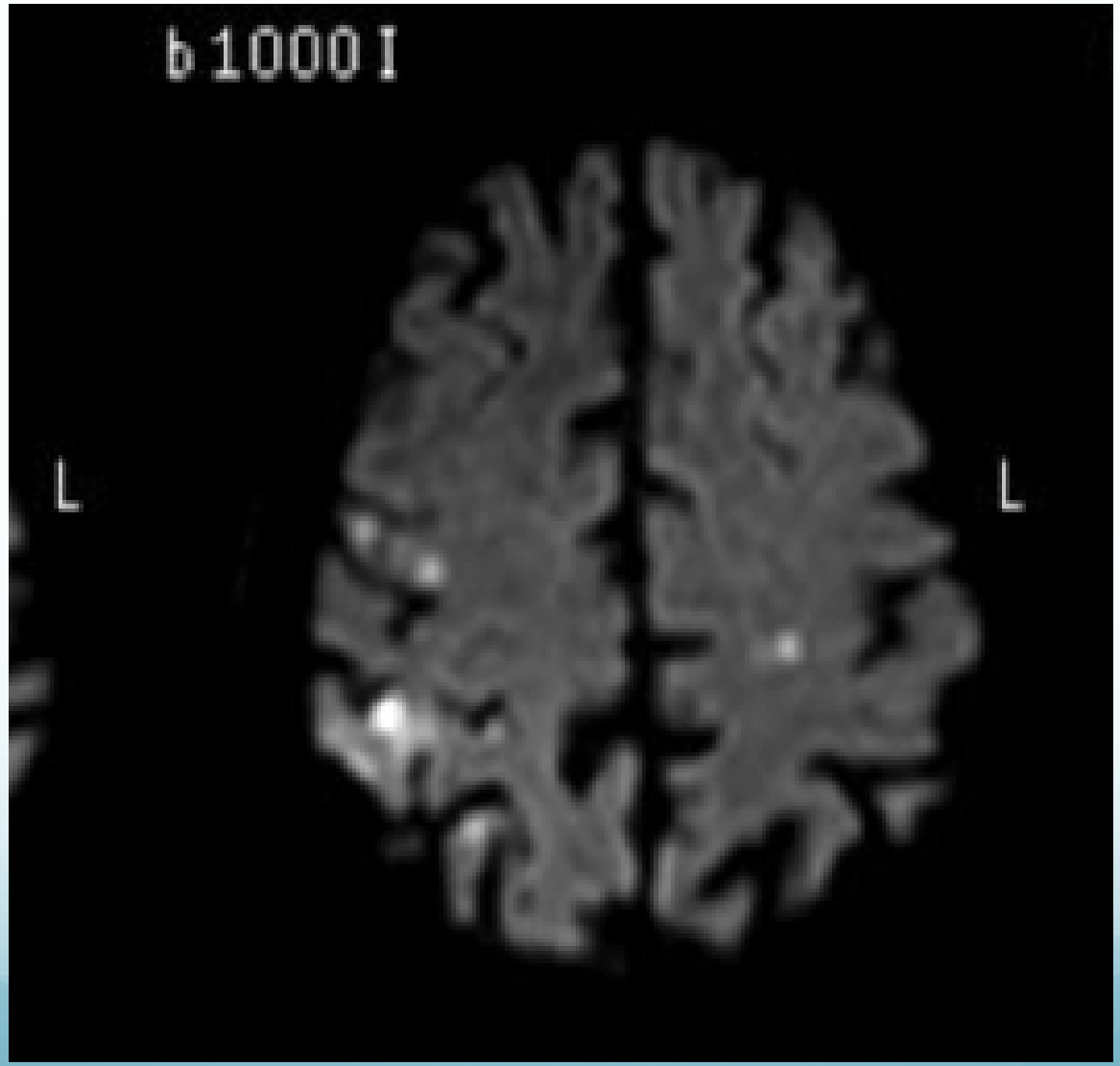
Lesioni ischemiche emboliche corticali



Lesioni ischemiche emboliche multiple (RMN DWI)



Lesioni ischemiche emboliche multiple (RMN DWI)



Trial clinici

RE-SPECT ESUS™
Study of secondary stroke prevention

Int J Stroke. 2015 Sep 30. doi: 10.1111/ijs.12630. [Epub ahead of print]

Design of Randomized, double-blind, Evaluation in secondary Stroke Prevention comparing the EfficaCy and safety of the oral Thrombin inhibitor dabigatran etexilate vs. acetylsalicylic acid in patients with Embolic Stroke of Undetermined Source (RE-SPECT ESUS).

Diener HC[1], Easton JD[2], Granger CB[3], Cronin L[4], Duffy C[5], Cotton D[5], Brueckmann M[6,7], Sacco RL[8]; **RE-SPECT ESUS** Investigators.

NAVIGATE ESUS

Rivaroxaban Versus Aspirin in Secondary Prevention of Stroke and Prevention of Systemic Embolism in Patients With Recent Embolic Stroke of Undetermined Source (ESUS) (NAVIGATE ESUS)

Grazie per l'attenzione